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Buffered vinegar dry as an effective listeristatic control measure in cooked ham (#120)

Ines Colle, Anja Verbiest, Glenn De Ceulaer

Kemin, Food Technologies EMEA, Herentals, Belgium

Introduction

Cooked ham is susceptible for growth of pathogens, such as *Listeria monocytogenes*. European authorities continue to demand more extensive prove of food safety by requesting microbial challenge tests. Food products don't support the growth of *L. monocytogenes* when the growth potential (δ) is below 0.5 $\log_{10}$ CFU/g[1]. If δ exceeds 0.5 $\log_{10}$ CFU/g, the concentration of *L. monocytogenes* at the end of the shelf-life should not exceed the legal limit of 100 CFU/g[1]. Food producers generally use preservatives like lactates (E325-E327) and acetates (E261-E263) to safeguard their products. However, consumers demand more often E-number free foods with ingredients they easily recognise. Natural buffered vinegar might be applied for this purpose. The objective of this study was to evaluate the ability of Buffered Vinegar Dry to inhibit the growth *of L. monocytogenes* in cooked ham. In addition, the utility of a predictive growth model was assessed.

Methods

Three different cooked hams were produced and contained 0%, 0.5% and 0.75% Buffered Vinegar Dry. The hams were sliced and inoculated in duplicate with a cocktail of three *L. monocytogenes* strains up to approximately 100 CFU/g. After inoculation the slices were MAP packed (30% CO_2, 70% N_2) and stored for 2 days at 4 °C followed by 54 days at 7 °C. *L. monocytogenes* enumeration was performed on a weekly basis. δ was calculated as the difference between the highest cell count and the inoculation level. δ was also predicted using the Listeria Meat Model developed by the Flemish Cluster Predictive Microbiology in Food.

Results

All tested cooked hams showed calculated δ-values higher than 0.5 $\log_{10}$ CFU/g. In the cooked ham without Buffered Vinegar Dry, outgrowth of *L. monocytogenes* was observed after 14 days of storage. Dry buffered vinegar significantly ($p<0.05$) retarded the growth. Based on the acceptance criterion (< 1 $\log_{10}$ increase of *L. monocytogenes*[2]), the shelf-life of the cooked ham with 0.5% and 0.75% Buffered Vinegar Dry was increased up to 35 and 56 days. Calculated and predicted δ's aligned for the hams with 0% and 0.5% dry buffered vinegar. However, for the ham with 0.75% Buffered vinegar Dry δ's were divergent.

Conclusion

All tested cooked hams supported growth of *L. monocytogenes.* Buffered Vinegar Dry clearly extended the shelf life and can be used as a label friendly listeristatic control measure by cooked ham producers. Predictive growth models are less expensive and time consuming and therefore a useful tool for fast screening of antimicrobial hurdles. However, since not all parameters are taken into account in the model, predicted δ's are less accurate and challenge tests remain the most reliable method for data generation of pathogenic growth in food matrices.

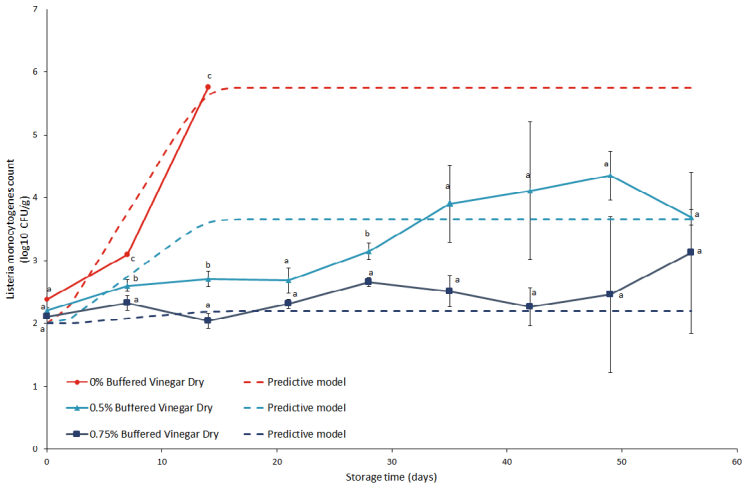

Figure 1
Average *Listeria monocytogenes* counts (n=2) of cooked ham treatments. Significant differences ($p<0.05$) within each time point are indicated with different letters. Error bars represent standard deviations.

Notes